

WHAT IS CLAIMED IS:

- 1 1. A method of storing page link information comprising:
2 obtaining page link information for a set of pages, the page link information including
3 for each page in the set a row of page identifiers of other pages;
4 arranging the rows of page identifiers in a particular order;
5 for each respective row:
6 identifying a reference row, if any, that best matches the respective row in
7 accordance with predefined row match criteria; and
8 encoding the respective row as an identifier for the identified reference row, if
9 any, a set of deletes representing page identifiers in the identified reference row not in the
10 respective row, and a set of adds representing page identifiers in the respective row not in the
11 identified reference row.
- 1 2. The method of claim 1, wherein the encoding for each respective row includes
2 Huffman coding values representing the set of deletes and the set of adds for each respective
3 row.
- 1 3. The method of claim 1, wherein the encoding for each respective row includes delta
2 encoding the set of deletes and delta encoding the set of adds for each respective row.
- 1 4. The method of claim 1, wherein the encoding for each respective row includes
2 delta encoding the set of deletes and delta encoding the set of adds for each respective
3 row; and
4 Huffman coding the delta encoded set of deletes and delta encoded set of adds for
5 each respective row.
- 1 5. The method of claim 4, including
2 sorting the page identifiers in each row in numerical order prior to performing the
3 encoding.
- 1 6. The method of claim 5, wherein the encoding includes generating a row distance
2 value that identifies the identified reference row and Huffman coding the row distance value.

1 7. The method of claim 4, including
2 when no reference row exists for a respective row, encoding the respective row by
3 encoding a null reference row identifier and a set of adds representing the page identifiers in
4 the respective row, delta encoding the set of adds for the respective row, and Huffman coding
5 the delta encoded set of adds for the respective row.

1 8. The method of claim 1, including
2 when no reference row exists for a respective row, encoding the respective row by
3 encoding a null reference row identifier and a set of adds representing the page identifiers in
4 the respective row.

1 9. A computer program product for use in conjunction with a computer system, the
2 computer program product comprising a computer readable storage medium and a computer
3 program mechanism embedded therein, the computer program mechanism comprising:
4 a first module for obtaining page link information for a set of pages, the page link
5 information including for each page in the set a row of page identifiers of other pages; and
6 a second module for storing the page link information, including instructions for:
7 arranging the rows of page identifiers in a particular order;
8 for each respective row:
9 identifying a reference row, if any, that best matches the respective row in
10 accordance with predefined row match criteria; and
11 encoding the respective row as an identifier for the identified reference row, if
12 any, a set of deletes representing page identifiers in the identified reference row not in the
13 respective row, and a set of adds representing page identifiers in the respective row not in the
14 identifier reference row.

1 10. The computer program product of claim 9, wherein the encoding instructions of the
2 second module include instructions for Huffman coding values representing the set of deletes
3 and the set of adds for each respective row.

- 1 11. The computer program product of claim 9, wherein the second module includes
2 instructions for delta encoding the set of deletes and delta encoding the set of adds for each
3 respective row.
- 1 12. The computer program product of claim 9, wherein the encoding instructions of the
2 second module include instructions for delta encoding the set of deletes and delta encoding
3 the set of adds for each respective row, and for Huffman coding the delta encoded set of
4 deletes and delta encoded set of adds for each respective row.
- 1 13. The computer program product of claim 12, wherein the second module includes
2 instructions for sorting the page identifiers in each row in numerical order prior to performing
3 the encoding.
- 1 14. The computer program product of claim 13, wherein the encoding instructions of the
2 second module include instructions for generating a row distance value that identifies the
3 identified reference row and Huffman coding the row distance value.
- 1 15. The computer program product of claim 12, wherein the second module includes
2 instructions, used when no reference row exists for a respective row, for encoding the
3 respective row by encoding a null reference row identifier and a set of adds representing the
4 page identifiers in the respective row, delta encoding the set of adds for the respective row,
5 and Huffman coding the delta encoded set of adds for the respective row.
- 1 16. The computer program product of claim 9, wherein the second module includes
2 instructions, used when no reference row exists for a respective row, for encoding the
3 respective row by encoding a null reference row identifier and a set of adds representing the
4 page identifiers in the respective row.
- 1 17. A web crawler system, comprising:
2 a central processing unit for performing computations in accordance with stored
3 procedures;
4 a network interface for accessing remotely located computers via a network;

5 memory, coupled to the central processing unit, for storing procedures and data,
6 including:
7 a web crawler module, executable by the central processing unit, for downloading a
8 set of pages from remotely located servers via the network interface;
9 a first module for obtaining page link information from the set of pages, the page link
10 information including for each page in the set a row of page identifiers of other pages; and
11 a second module for storing the page link information, including instructions for:
12 arranging the rows of page identifiers in a particular order;
13 for each respective row:
14 identifying a reference row, if any, that best matches the respective row in
15 accordance with predefined row match criteria; and
16 encoding the respective row as an identifier for the identified reference row, if
17 any, a set of deletes representing page identifiers in the identified reference row not in the
18 respective row, and a set of adds representing page identifiers in the respective row not in the
19 identified reference row;

1 18. The system of claim 17, wherein the encoding instructions of the second module
2 include instructions for Huffman coding values representing the set of deletes and the set of
3 adds for each respective row.

1 19. The system of claim 17, wherein the encoding instructions of the second module
2 include instructions for delta encoding the set of deletes and delta encoding the set of adds for
3 each respective row.

1 20. The system of claim 17, wherein the encoding instructions of the second module
2 includes instructions for delta encoding the set of deletes and delta encoding the set of adds
3 for each respective row, and for Huffman coding the delta encoded set of deletes and delta
4 encoded set of adds for each respective row.

1 21. The system of claim 20, wherein the second module includes instructions for sorting
2 the page identifiers in each row in numerical order prior to performing the encoding.

1 22. The system of claim 21, wherein the encoding instructions of the second module
2 include instructions for generating a row distance value that identifies the identified reference
3 row and Huffman coding the row distance value.

1 23. The system of claim 20, wherein the second module includes instructions, used when
2 no reference row exists for a respective row, for encoding the respective row by encoding a
3 null reference row identifier and a set of adds representing the page identifiers in the
4 respective row, delta encoding the set of adds for the respective row, and Huffman coding the
5 delta encoded set of adds for the respective row.

1 24. The system of claim 17, wherein the second module includes instructions, used when
2 no reference row exists for a respective row, for encoding the respective row by encoding a
3 null reference row identifier and a set of adds representing the page identifiers in the
4 respective row.

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50